

THE COMBINED EFFECT OF MOISTURE
AND GROWTH REGULATORS ON WHEAT

By

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APPROVAL SHEET

THE COMBINED EFFECT OF MOISTURE AND GROWTH REGULATORS
ON WHEAT

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A C K N O W L E D G E M E N T

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C O N T E N T S

	Page
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	3
2.1. Soil moisture in relation to growth and yield	3
2.2. Effect of time of nitrogen application, on yield of wheat and quality of grain	11
2.3. Effect of CCC, on yield of wheat and quality of grain	16
3. MATERIALS AND METHODS	20
3.1. Physical and chemical properties of the field plots.	20
3.2. Climatic conditions	20
3.3. The lay-out of the experiment	20
3.4. Cultural practices	24
3.5. Sampling techniques	25
3.6. Analytical procedure	26
4. RESULTS AND DISCUSSION	28
4.1. Effect of soil moisture, in combination with CCC, on yield of wheat	28
4.2. Effect of soil moisture, in combination with CCC, and time of nitrogen application, on yield of wheat	37

CONTENTS

	Page
4.3. Effect of soil moisture, in combination with CCC and time of nitrogen application, on the technological characters of wheat grains	42
4.4. Effect of soil moisture, in combination with CCC, on the consumptive use of wheat.	51
5. SUMMARY	62
6. BIBLIOGRAPHY	64
7. ARABIC SUMMARY.	

LIST OF TABLES

<u>Table</u>	<u>Page</u>
1 Some physical and chemical properties of the soil of the experimental farm	21
2 The monthly rainfall, average relative humidity, average temperature, and day length during the growing season 1968/69.	22
3 Field capacity, bulk density, and wilting percentage of the experimental plots	25
4 Effect of soil moisture and time of nitrogen fertilizer application, in combination with CCC on yield of grain and straw.	29
5 Effect of soil moisture and time of nitrogen application, in combination with CCC on number of grain per ear.	32
6 Effect of soil moisture and time of nitrogen application in combination with CCC on weight of (1000) grain	33
7 Effect of soil moisture and time of nitrogen application in combination with CCC on the plant heights	35

LIST OF TABLES (CONT.)

<u>Table</u>		<u>Page</u>
	Effect of available soil moisture, in combination with CCC and time of nitrogen application on protein content in the grains	43
9	Effect of soil moisture, in combination with time of nitrogen application and CCC, on the flour yield	47
10	Effect of available soil moisture, in combination with CCC and time of nitrogen application, on protein quality of wheat.	49
11	Consumptive use of wheat during the growth season when 50 % of available soil moisture was depleted (M_1)	52
12	Consumptive use of wheat during the growth season when 75 % of available soil moisture was depleted (M_2)	53
13	Consumptive use of wheat during the growth season when 100 % of available soil moisture was depleted (M_3).	54

LIST OF TABLES (Cont.)

<u>Table</u>		<u>Page</u>
14	Effect of available soil moisture, in combination with CCC, on the amount of soil moisture depleted	58
15	Efficiency of water-use by wheat as affected by irrigation levels in combination with CCC.	60

LIST OF ILLUSTRATIONS

<u>Figure</u>	<u>Page</u>
1 Effect of soil moisture, in combination with CCC, on yield of wheat	30
2 Effect of soil moisture, in combination with CCC and time of nitrogen application, on plant heights	36
3 Effect of time of nitrogen application, in combination with CCC, on yield of wheat	38
4 Effect of soil moisture, in combination with CCC and time of nitrogen application on grain yield	40
5 Effect of soil moisture, in combination with time of nitrogen application and CCC, on protein content in grains	46
6 Effect of soil moisture on the daily rate of consumptive use by wheat	55

1. INTRODUCTION

Wheat is one of the cereal crops in U.A.R., it is considered as the first nutritional crop. At the same time, it is found that there is a shortage in the quantity of this crop for the local consumption. To give an idea about this shortage in this crop it is enough to know that only 1.7 million tons were produced in 1966 and 2.48 million tons were imported to balance the local consumption which was about 3.95 million tons. The area cultivated in 1966 is about 1.4 million feddan.

So many efforts must be done by all the scientists dealing with the agricultural problems to improve the quality as well as the quantity produced by the soil unit area of the soil.

There are many factors that affect the production and the quality of the different crops. As a matter of fact, soil moisture is one of the most important factors, affecting plant growth. The quantity of available water may play its role on both vegetative growth and crop yields.

Recently, investigations revealed that the growth regulators have their effects on yields specially its highly

practical importance for preventing lodging of cereals and consequently higher yields could be obtained.

In addition, it is well known that the time of application of nitrogen fertilizers has its great effect on the yield of the crops. So, it will be more useful to take this factor into consideration when studying problems related to crop production.

The aim of this study is to trace the effect of the soil moisture as levels of available moisture and the growth regulator on both quality and quantity of wheat yield, taking into consideration the time of application of nitrogen fertilizer.

2. REVIEW OF LITERATURE

A brief review of the work done with regard to the effect of soil moisture, growth regulator (CCC) (2-chloro-ethyl-trimethyl ammonium chloride) as well as time of applying nitrogen fertilizer upon wheat crop, and their interaction is presented on the following pages. For the sake of convenience the subject will be reviewed under three separate headings namely :

- 1- Soil moisture in relation to growth and yield .
- 2- Effect of time of nitrogen application on yield of wheat and quality of grain.
- 3- Effect of CCC on yield of wheat and quality of grain.

2.1. Soil moisture in relation to growth and yield :

It is obviously settled that the soil moisture is one of the important factors affecting plant growth when dealing with such factor, the available water and its effect on plant growth and also on the quality of the grain as well as the consumptive use will be the two items of this part.

The available moisture as defined by Kramer (1949) is the moisture that can be used by plants in growth and

- 11 -

1. therefore the moisture above the permanent-wilting percentage, or first permanent wilting point - while gravitational water is readily available to plants, it usually drains off too soon to be of much importance. The readily available water, therefore, is usually considered to be that included in the range from field capacity down to the permanent-wilting percentage.

Leckett and Robertson (1917), Marr et al. (1927), and Oppenheimer and Elze (1941) indicated that plants respond favourably to relatively high soil moisture conditions. They also concluded that plant growth diminishes progressively as the soil moisture content falls below field capacity and ceases at the permanent wilting percentage.

On the other hand, Veihmeyer and Hendrickson (1950) stated that plants can obtain a supply of water with equal facility between field capacity and the permanent wilting percentage. Their view was, that rate of growth is not diminished over the available range or, in other words that no measurable increase in rate of growth are obtained by irrigating until the soil moisture falls to near the permanent wilting percentage.

Hagan (1967), presented that plant growth is a function of soil moisture stress. He indicated that growth is not affected in sandy soils when the soil moisture level falls to permanent wilting percentage. But, the growth decreased in clay soils when soil moisture level falls to about 50 % of the available moisture.

The soil water or in other words the available water will affect greatly both the growth and the yield of the different crops. Wiastoe (1912) indicated that if wheat crop grown under moderately dry conditions, is irrigated, increasing the amount of the irrigation water will increase the amount of leaf, and hence the straw yield would be increase much more than the grain. Legett and Nelson (1960) indicated that the low supply of available soil moisture resulted in lowering wheat yields obtained.

Jackowska (1961) found that, decrease of soil moisture to 20 % of total water capacity even for a short time impaired development and reduced grain yields and (1000 grain weight). Increase of soil moisture to 85 % of total water capacity for short duration did not affect grain yields. Straw yields increased with increasing moisture and decreased with decreasing moisture, only